Application of Radar Data to Remote Sensing and Geographical Information Systems

Jakob J. van Zyl

Jet Propulsion Laboratory
California Institute of Technolgy
4800 Oak Grove Drive
Pasadena, California, U.S.A.
91109

e-mail: Jakob.vanZyl@jpl.nasa.gov

The field of synthetic aperture radar changed dramatically over the past decade with the operational introduction of advance radar techniques such as polarimetry and interferometry. **Radar polarimetry** became an operational research tool with the introduction of the NASA/JPL AIRSAR system in the early 1980's, and reached a climax with the two SIR-C/X-SAR flights on board the space shuttle Endeavour in April and October 1994. Radar interferometry received a tremendous boost when the airborne TOPSAR system was introduced in 1991 by NASA/JPL, and further when data from the European Space Agency ERS-1 radar satellite became routinely available in 1991. Several airborne interferometric SAR systems are either currently operational, or are about to be introduced.

Radar interferometry is a technique that allows one to map the topography of an area automatically under all weather conditions, day or night. The real power of radar interferometry is that the images and digital elevation models are automatically geometrically resampled, and could be imported into GIS systems directly after suitable reformatting. When combined with polarimetry, a technique that uses polarization diversity to gather more information about the geophysical properties of the terrain, a very rich multi-layer data set is available to the remote sensing scientist.

This talk will discuss the principles of radar interferometry and polarimetry with specific application to the automatic categorization of land cover. Examples will include images acquired with the NASA/JPL AIRSAR/TOPSAR system in Australia and elsewhere.